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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/003,490

11/01/2001

Francois Serge Nicolas

15-XZ-5547

7319

7590

11/18/2003

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EXAMINER

THOMAS, COURTNEY D

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/003,490

Applicant(s)

NICOLAS ET AL.

Examiner

Courtney Thomas

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

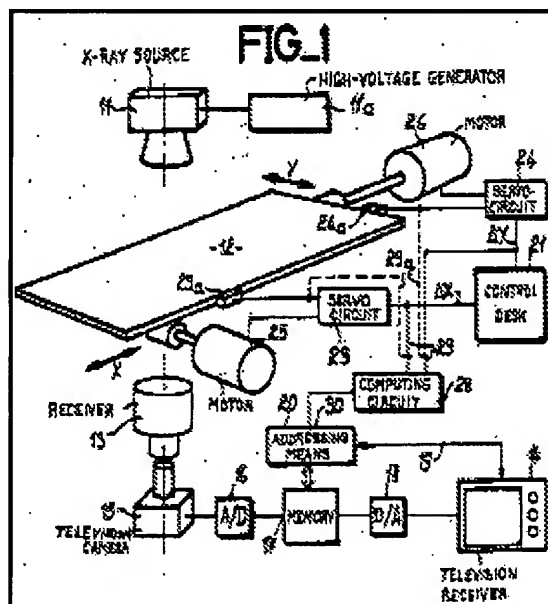
DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-16, 18-29 and 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klausz (U.S. Patent 4,633,494) in view of Smith et al (U.S. Patent 6,282,264).



3.

[57]

ABSTRACT

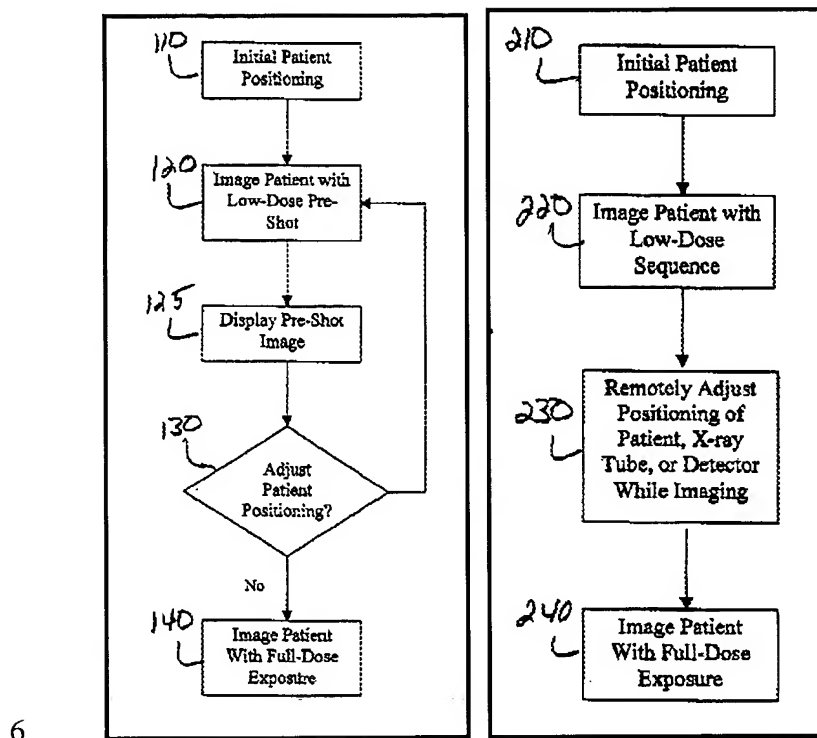
A method and apparatus for positioning a patient with respect to an X-ray installation. An X-ray image is produced at the beginning of the operation and stored in an image memory. The memory is read in order to visualize the X-ray image on a television receiver. The table is displaced to a desired position, and the image in the receiver is decentered so as to reproduce the image that would be observed if an X-ray were taken at the desired position.

4.

Figure 1 and Abstract - U.S. Patent 4,633,494 to Klausz

5. As per claims 1, 18 and 31, Klausz discloses a method comprising the steps of a) positioning a patient between an X-ray emitter and X-ray detector, b) imaging the patient to determine an image, c) analyzing the image to determine positioning of the patient relative to the X-ray emitter and X-ray detector, d) adjusting the positioning of the patient relative to at least one of the X-ray emitter and X-ray detector and e) imaging the patient (see abstract, column 1, column 2 lines 1-47). Klausz does not explicitly disclose however, a method wherein imaging the patient (in step b) utilizes a low dose pre-shot, and subsequently imaging the patient (in step e) with a full dose exposure.

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Figs. 1 and 2 – U.S. Patent Application Publication No.: US 2003/0081734 A1 to Nicholas et al.

7.

Other system embodiments are desired or useful in a digital system. One preferred embodiment includes the capability of the system to perform a low-dose preview image prior to the final full-radiation image. In this procedure, the patient is positioned as desired, and a low-dose scout shot is performed. The resultant image is displayed, and is analyzed by the operator for proper positioning of the patient, detector, and x-ray tube. If the alignment is adequate, a second full-exposure image is acquired.

Column 17, lines 52-61 – U.S. Patent 6,282,264 to Smith et al.

8. Smith et al. teach a method of obtaining X-ray images comprising the steps of utilizing a low dose pre-shot to obtain a low dose image, and subsequently imaging a patient with a full dose exposure to obtain a full exposure image (see above).

9. It would have been obvious to modify the method of Klausz such that it incorporated the method steps of Smith et al. One would have been motivated to make such a modification so that

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the position determining steps do not sufficiently add to the total radiation exposure experienced by a patient, since it is commonly understood that elevated levels of radiation exposure are capable of causing significant cellular damage in living tissue. The use of a full or regular imaging dose is applied so that the generated image is of high quality, distinctly highlighting contrasts of the internal structure of a patient as suggested by Smith et al. (column 17, lines 52-61)

10. **As per claims 2, 19**, Klausz as modified does not explicitly disclose a method wherein the adjusting step (step d above) includes adjusting the positioning of the patient and then re-imaging the patient with a second low dose pre-shot prior to imaging the patient with a full dose.

11. It would have been obvious to further modify the method of Klausz such that it incorporated the aforementioned limitation. One would have been motivated to make such a modification so that an operator could verify the intended position of a patient prior to imaging as suggested by Smith et al. (see above).

12. **As per claims 3-6 and 20**, Klausz as modified, does not explicitly disclose a method wherein low dose pre shots are defined and wherein the imaging parameters are varied between low dose pre-shot and full dose exposure and varied according to patient size and anatomical view.

13. It would have been obvious to further modify the method of Klausz such that it incorporated the step of defining low dose pre-shots and full exposure and wherein the imaging parameters are varied between low dose pre-shot and full dose exposure. One would have been motivated to make such a modification so that exposure levels can be adjusted to limit the total radiation exposure experienced by a patient. Additionally, it would have been obvious to further

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modify the disclosed method so that the imaging parameters are selectively alterable between low dose and full exposure so that generated images can be used for either positioning or internal analysis purposes as suggested by Smith et al. (column 17, lines 52-61). It is commonly understood that full or regular imaging doses are varied with respect to the intended imaging areas (i.e. thorax vs. abdominal) so that generated images are of high quality, enabling easy identification of elements within the internal structure of a patient.

14. **As per claims 7-10 and 21-23**, Klausz as modified does not explicitly disclose a method wherein a) the system is controlled by a technician from a remote acquisition console b) the system is controlled automatically and c) wherein low dose pre-shots generate images within one and five seconds.

15. It would have been obvious to further modify the method of Klausz such that it incorporated the above limitations. One would have been motivated to make such a modification so that a technician is not exposed to radiation as the system is operated. Additionally, it would have been obvious to modify the method so that the system is capable of automatically carrying out a series of image generations, thereby reducing examination time and radiation exposure to the patient as suggested by Smith et al. (column 17, lines 52-61).

16. **As per claims 11-16 and 24-29**, Klausz as modified does not explicitly disclose a method wherein imaging includes imaging a patient with a low dose X-ray imaging sequence, wherein frames occur at a rate of at least 5 frames per second and the sequences are sub-sampled prior to processing.

17. It would have been obvious to further modify the method of Klausz such that it incorporated the above limitations. One would have been motivated to make such a modification

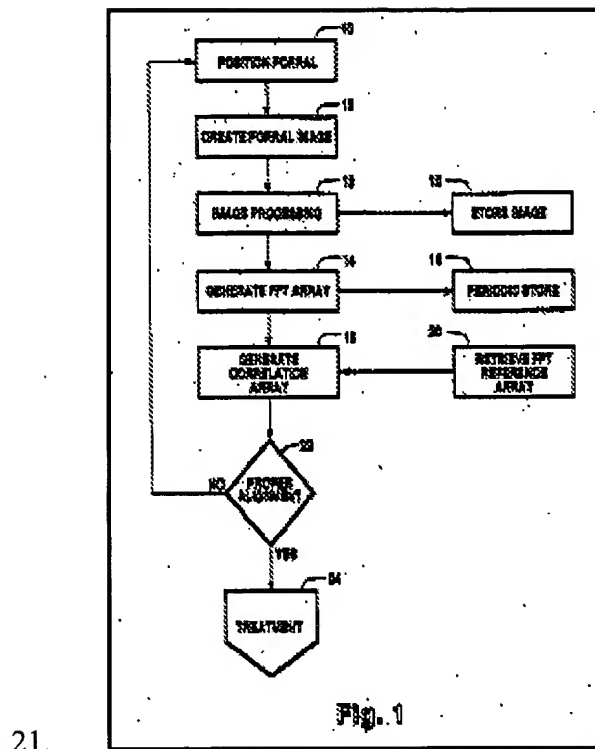
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so that the system is configured to acquire multiple images of a patient in which ideal positioning can be determined. A benefit of achieving high frame rates, such as that of at least 5 frames per second is that initial patient setups can be accomplished in a short amount of time thereby reducing the total examination time experienced by a patient. Additionally, it would have been obvious to modify the disclosed method so that multiple image data are collected and optimally arranged, so that system components do not experience "slow down" during processing, due to the large amount of information contained in obtained image sets. A benefit of such a modification is that it assists in reducing examination time by enabling data to be quickly analyzed.

18. **As per claims 32-35**, Klausz as modified does not explicitly disclose a method wherein processing includes providing zero point parameters, saturation management parameters, field of view parameters or physical filter parameters.

19. It would have been obvious to further modify the method of Klausz such that it incorporated the aforementioned limitations. One would have been motivated to make such a modification so images are optimized for high quality display, wherein artifacts synonymous with the alteration between varying levels of radiation is minimized as suggested by Smith et al.

20. Claims 17 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klausz (U.S. Patent 4,633,494) and Smith et al (U.S. Patent 6,282,264) in view of Boyer (U.S. Patent 5,295,200).



22.

[57] **ABSTRACT**

A method and apparatus are provided for quickly determining misalignment between two images. Patient misalignment calculations can be performed on-line using Fourier correlation analysis to compare the location of a portal field of radiation with a previously stored portal reference field. Fourier comparisons are done in both hardware and software which rapidly computes misalignment of a patient relative to the portal field and can also rapidly reposition the patient with respect to that field.

Figure 1 and Abstract - U.S. Patent 5,295,200 to Boyer

23. As per claims 17 and 30, Klausz as modified in view of Smith, does not explicitly disclose a method wherein verifying includes automatic verification using a computer algorithm.

24. Boyer teaches a method comprising the use of a computer algorithm for determining the alignment of an object (see Fig. 1 and abstract, above).

25. It would have been obvious to further modify the method of Klausz such that it incorporated automatic verification of pre-shot images using a computer algorithm. One would

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have been motivated to make such a modification so that an operator is able to obtain ideal patient position information based on processor analysis of ideal settings or recognized image shifts. A benefit of such a modification is that patient positioning can be optimized based on algorithmic calculations for ideal image capture as taught by Boyer (Fig. 1 and abstract, above; see also column 5, lines 9-36).

Response to Arguments

26. Applicant's arguments filed 10/15/03 have been fully considered but they are not persuasive. In particular, Klausz (U.S. Patent 4,633,494) discloses a method comprising the steps of:

27. **a)** positioning a patient between an X-ray emitter and X-ray detector,

28. **b)** imaging the patient to determine an image,

29. **c)** analyzing the image to determine positioning of the patient relative to the X-ray emitter and X-ray detector and

30. **d)** adjusting the positioning of the patient relative to at least one of the X-ray emitter and X-ray detector and **e)** imaging the patient (see abstract, column 1, column 2 lines 1-47).

31. Secondary reference to Smith et al (U.S. Patent 6,282,264) is provided to meet the limitations as set by applicants' amendment. Smith et al. teach a method of obtaining X-ray images comprising the steps of utilizing a low dose pre-shot to provide a low dose image and to subsequently image the patient with a full dose exposure (column 17, lines 52-61).

Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (703) 306-0473. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (703) 308 4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Courtney Thomas


EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER